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west virginia department of environmental protection

Earl Ray Tomblin, Governor  
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## G70-C GENERAL PERMIT ENGINEERING EVALUATION

PREVENTION AND CONTROL OF AIR POLLUTION IN REGARD TO THE CONSTRUCTION, MODIFICATION,  
RELOCATION, ADMINISTRATIVE UPDATE AND OPERATION OF NATURAL GAS PRODUCTION FACILITIES  
LOCATED AT THE WELL SITE

APPLICATION NO.: **G70-C168A**

FACILITY ID: **017-00156**

- ☐ CONSTRUCTION  
☒ MODIFICATION  
☐ RELOCATION

- ☐ CLASS I ADMINISTRATIVE UPDATE  
☐ CLASS II ADMINISTRATIVE UPDATE

### BACKGROUND INFORMATION

Name of Applicant (as registered with the WV Secretary of State's Office): **Antero Resources Corporation**

Federal Employer ID No. (FEIN): **80-0162034**

Applicant's Mailing Address: **1615 Wynkoop Street**

City: **Denver**

State: **CO**

ZIP Code: **80202**

Facility Name: **Stanley Wellpad**

Operating Site Physical Address: **428 Cabin Run Rd.**

If none available, list road, city or town and zip of facility.

City: **West Union**

Zip Code: **26456**

County: **Doddridge**

Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits):

Latitude: **39.23680**

Longitude: **-80.87963**

SIC Code: **1311**

NAICS Code: **211111**

Date Application Received:  
**September 8, 2016**

Fee Amount: **\$1,500**

Date Fee Received: **September 12, 2016**

Applicant Ad Date: **September 19, 2016**

Newspaper: **The Doddridge Independent**

Date Application Complete: **January 9, 2017**

Due Date of Final Action: **February 23, 2017**

Engineer Assigned: **David Keatley**

Description of Permitting Action: **Installation and operation of: two (2) 400-bbl produced water tanks, one (1) 12-mmBtu/hr enclosed combustor, five (5) 76-bhp compressor engine, two (2) 110-bhp compressor engine, and increase in production. Removal of one (1) 24-bhp compressor engine.**

## PROCESS DESCRIPTION

This is a natural gas and condensate production facility. Raw natural gas (natural gas, condensate, and produced water) from eight (8) natural gas wells first goes to eight (8) 2.0-mmBtu/hr line heaters and then eight (8) 1.5-mmBtu/hr gas production unit (GPU) heaters (H001 through H008) to help prevent freezing and promote phase separation. Natural gas from the GPUs will exit the facility via pipeline. The produced water from the GPUs goes to four (4) 400-bbl produced water tanks. Produced water will be trucked off site at a maximum rate of 7,358,400 gallons/year. Condensate from the GPUs will go to low-pressure 2-phase separators. The gas from the low-pressure 2-phase separators is compressed by five compressors and exits the facility via pipeline. The five compressors are powered by five (5) four-stroke rich-burn Ford MSG-425 76-bhp natural gas fired high-pressure VRU compressor engines equipped with a non-selective catalyst. The condensate from the low-pressure 2-phase separators goes to vapors recovery towers. The liquids from the vapor recovery towers goes to ten (10) 400-bbl condensate tanks. Condensate will be trucked off site at a maximum rate of 33,266,100 gallons/year. Working, breathing, and flash losses from the condensate tanks and produced water tanks will be controlled to a minimum of 98% control efficiency by three (3) 12-mmBtu/hr 48" Cimarron enclosed combustor (EC001 through EC003).

## SITE INSPECTION

Site Inspection Date: July 22, 2015

Site Inspection Conducted By: James Robertson

Results of Site Inspection: The area is generally remote with only scattered houses. The site is located near the top of a hill overlooking Taylor Drain Road and Cabin Run Road with no nearby residences or structures.

Did Applicant meet Siting Requirements? Yes

If applicable, was siting criteria waiver submitted? Not Applicable (NA)

Directions to Facility: From US 50 turn onto Old US 50 E (Sunnyside Rd). Travel on Old US 50 E for approximately 1.9 miles and turn left onto CR 21 (Oxford Rd.). Travel on CR 21 for approximately 2.0 miles and turn right onto CR 21/1 (Cabin Run). Travel on CR 21/1 for approximately 0.4 miles to the access the road. Follow the access road for approximately 1.4 miles to the site.

Overhead Google Earth Image of Facility:



## ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

The following table indicates which methodology was used in the emissions determination:

Emission Unit ID#	Process Equipment	Calculation Methodology (e.g. ProMax, GlyCalc, mfg. data, AP-42, etc.)
GPU001 through GPU008	Gas Production Unit (GPU) Burners	EPA AP-42 emission factors
LH001 through LH008	Line Heaters	EPA AP-42 emission factors
TANKCOND001 through TANKCOND010	Condensate Tanks	ProMax using liquid sample from Vogt Pad and gas sample from Pike.
TANKPW001 through TANKPW004	Produced Water Tank	ProMax using liquid sample from Vogt Pad and gas sample from Pike.
L001 and L002	Condensate and Produced Water Truck Loading	EPA AP-42 Chapter 5 equation, submerged loading, dedicated service
EC001 through EC003	Enclosed Combustors	EPA AP-42 emission factors
ENG001 through ENG005	VRU Compressor Engines	Manufacturer Data and EPA AP-42 emission factors
ENG006 through ENG007	VRU Compressor Engines	Manufacturer Data and EPA AP-42 emission factors

The total facility PTE for the facility (including fugitive emissions) is shown in the following table:

Pollutant	Facility Wide PTE (tons/year)
Nitrogen Oxides	22.74
Carbon Monoxide	71.56
Volatile Organic Compounds	41.45
Particulate Matter	1.05
Particulate Matter-10/2.5	1.05
Sulfur Dioxide	0.08
Formaldehyde	0.45
Total HAPs	3.08
Carbon Dioxide Equivalent	18,594

Emission Point ID	Emission Unit ID	Emission Source	Pollutant	Maximum Hourly Emissions (lb/hr)	Maximum Annual Emissions (tpy)
EP-EC001 Through EP-EC003	EC001 Through EC003 (Controlling TANKCOND001-010 and TANKPW001-002)	Cimarron Combustors (Controlling Condensate and Produced Water Tanks)  Emissions per Each	Nitrogen Oxides	0.82	3.58
			Carbon Monoxide	3.72	16.30
			Volatile Organic Compounds	1.51	6.60
			Total Particulate Matter	0.01	0.03
			n-Hexane	0.09	0.37
			CO <sub>2</sub> e	312	1,366
EP-GPU001 through EP-GPU008	EU-GPU001 through EU-GPU008	Gas Production Unit Burners 1.5 mmBtu/hr  (Emissions per Each)	Nitrogen Oxides	0.12	0.53
			Carbon Monoxide	0.11	0.45
			Volatile Organic Compounds	0.01	0.03
			Total Particulate Matter	0.01	0.04
EP-LH001 through EP-LH008	EU-LH001 through EU-LH008	Line Heaters 2.0 mmBtu/hr  (Emissions per Each)	CO <sub>2</sub> e	145	636
			Nitrogen Oxides	0.16	0.71
			Carbon Monoxide	0.14	0.59
			Volatile Organic Compounds	0.01	0.04
			Total Particulate Matter	0.02	0.06
			CO <sub>2</sub> e	194	848
EP-ENG001	ENG001 through ENG005	High-Pressure VRU Compressor Engine	Nitrogen Oxides	0.07	0.28
			Carbon Monoxide	0.42	1.81

through EP- ENG005		Ford MSG-425 76 bhp (Emissions per Each)	Volatile Organic Compounds 0.02 0.09 Total Particulate Matter 0.01 0.03 CO <sub>2</sub> e 78 340
EP- ENG006 and EP- ENG007	EU-ENG006 and EU- ENG007	Low-Pressure VRU Compressor Engine Ford CSG-637 110 bhp (Emissions per Each)	Nitrogen Oxides 0.08 0.32 Carbon Monoxide 0.60 2.62 Volatile Organic Compounds 0.03 0.12 Total Particulate Matter 0.01 0.04 CO <sub>2</sub> e 105 456
EP-L001	L001	Condensate Truck Loading	Volatile Organic Compounds 12.40 20.46 n-Hexane 0.11 0.18 CO <sub>2</sub> e 1 2
EP-L002	L002	Produced Water Truck Loading	Volatile Organic Compounds <0.01 <0.01 CO <sub>2</sub> e 1 3
EP-FUG	EU-FUG	Fugitive Emissions	Volatile Organic Compounds 2.82 12.36 Benzene <0.01 0.03 Ethylbenzene 0.02 0.08 n-Hexane 0.27 1.17 Toluene 0.02 0.09 Xylenes 0.06 0.23 CO <sub>2</sub> e 70 307

## REGULATORY APPLICABILITY

### 45CSR2 (Particulate Air Pollution from Combustion of Fuel in Indirect Heat Exchangers)

The purpose of 45CSR2 (Particulate Air Pollution from Combustion of Fuel in Indirect Heat Exchangers) is to establish emission limitations for smoke and particulate matter which are discharged from fuel burning units.

45CSR2 states that any fuel burning unit that has a heat input under ten (10) MMBTU/hr is exempt from Sections 4 (weight emission standard), 5 (control of fugitive particulate matter), 6 (registration), 8 (testing, monitoring, recordkeeping, reporting) and 9 (startups, shutdowns, malfunctions). However, failure to attain acceptable air quality in parts of some urban areas may require the mandatory control of these sources at a later date. If the individual heat input of all of the proposed fuel burning units are below 10 MMBTU/hr, these units are exempt from the aforementioned sections of 45CSR2. However, the registrant would be subject to the opacity requirements in 45CSR2, which is 10% opacity based on a six minute block average. Fuel burning units greater than 10 MMBTU/hr are ineligible for registration under General Permit G70-C

Emission Unit ID#	Emission Unit Description	Maximum Design Heat Input (MDHI) (MMBTU/hr)
GPU001 through GPU008	Gas Production Unit (GPU) Burners	1.5
LH001 through LH008	Line Heaters	2.0

### 45CSR6 (To Prevent and Control Air Pollution from the Combustion of Refuse)

45CSR6 prohibits open burning, establishes emission limitations for particulate matter, and establishes opacity requirements. Sources subject to 45CSR6 include completion combustion devices, enclosed combustion devices, and flares.

The facility-wide requirements of the general permit include the open burning limitations §§45-6-3.1 and 3.2.

All completion combustion devices, enclosed combustion devices, and flares are subject to the particulate matter weight emission standard set forth in §45-6-4.1; the opacity requirements in §§45-6-4-3 and 4-4; the visible emission standard in §45-6-4.5; the odor standard in §45-6-4.6; and, the testing standard in §§45-6-7.1 and 7.2.

Enclosed combustion control devices and flares that are used to comply with emission standards of NSPS, Subpart OOOO are subject to design, operational, performance, recordkeeping and reporting requirements of the NSPS regulation that meet or exceed the requirements of 45CSR6.

Emission Unit ID#	Maximum Design Heat Input (MDHI) (MMBTU/hr)	Subject to Weight Emission Standard?	Control Efficiency Claimed by Registrant	Provide Justification how 45CSR6 is met.
EC001 through EC003	12	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	98%	The estimated total particulate matter emissions are less than the allowable emission limits.

#### 45CSR10 (To Prevent and Control Air Pollution from the Emission of Sulfur Oxides)

45CSR10 establishes emission limitations for SO<sub>2</sub> emissions which are discharged from stacks of fuel burning units. A “fuel burning unit” means and includes any furnace, boiler apparatus, device, mechanism, stack or structure used in the process of burning fuel or other combustible material for the primary purpose of producing heat or power by indirect heat transfer. Sources that meet the definition of “Fuel Burning Units” per 45CSR10-2.8 include GPUs, in-line heaters, heater treaters, and glycol dehydration unit reboilers.

Fuel burning units less than 10 MMBtu/hr are exempt. The sulfur dioxide emission standard set forth in 45CSR10 is generally less stringent than the potential emissions from a fuel burning unit for natural gas. The SO<sub>2</sub> emissions from a fuel burning unit will be listed in the G70-C permit registration at the discretion of the permit engineer on a case-by-case basis. Issues such as non-attainment designation, fuel use, and amount of sulfur dioxide emissions will be factors used in this determination. Fuel burning units greater than 10 MMBTU/hr are ineligible for registration under General Permit G70-C

Fuel burning units burning natural gas are exempt from Section 8 (Monitoring, Recording and Reporting) as well as interpretive rule 10A. The G70-C eligibility requirements exclude from eligibility any fuel burning unit that does not use natural gas as the fuel; therefore, there are no permit conditions for 45CSR10.

Emission Unit ID#	Emission Unit Description	Maximum Design Heat Input (MDHI) (MMBTU/hr)
GPU001 through GPU008	Gas Production Unit (GPU) Burners	1.5
LH001 through LH008	Line Heaters	2.0

#### 45CSR13 (Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Administrative Updates, Temporary Permits, General Permits, and Procedures for Evaluation)

45CSR13 applies to this source due to the fact that the applicant is defined as a “stationary source” under 45CSR13 Section 2.24.b. *Stationary source* means, for the purpose of this rule, any building, structure, facility, installation, or emission unit or combination thereof, excluding any emission unit which meets or falls below the criteria delineated in Table 45-13B which: (a) is subject to any substantive requirement of an emission control rule promulgated by the Secretary; (b) discharges or has the potential to discharge more than six (6) pounds per hour and ten (10) tons per year, or has the potential to discharge more than 144 pounds per calendar day, of any regulated air pollutant; (c) discharges or has the potential to discharge more than two (2) pounds per hour or five (5) tons per year of hazardous air pollutants considered on an aggregated basis; (d) discharges or has the potential to discharge any air pollutant(s) listed in Table 45-13A in the amounts shown in Table 45-13A or greater; or, (e) an owner or operator voluntarily chooses to be subject to a construction or modification permit pursuant to this rule, even though not otherwise required to do so. 45CSR13 has an original effective date of June 1, 1974.

The applicant meets the definition of a stationary source because (check all that apply):

- ☐ Subject to a substantive requirement of an emission control rule promulgated by the Secretary.
- ☒ Discharges or has the potential to discharge more than six (6) pounds per hour and ten (10) tons per year, or has the potential to discharge more than 144 pounds per calendar day, of any regulated air pollutant.
- ☐ Discharges or has the potential to discharge more than two (2) pounds per hour or five (5) tons per year of hazardous air pollutants considered on an aggregated basis.
- ☐ Discharges or has the potential to discharge any air pollutant(s) listed in Table 45-13A in the amounts shown in Table 45-13A or greater.
- ☐ Voluntarily chooses to be subject to a construction or modification permit pursuant to this rule, even though not otherwise required to do so.



General Permit G70-C Registration satisfies the construction, modification, relocation and operating permit requirements of 45CSR13. General Permit G70-C sets forth reasonable conditions that enable eligible registrants to establish enforceable permit limits.

Section 5 of 45CSR13 provides the permit application and reporting requirements for construction of and modifications to stationary sources. No person shall cause, suffer, allow or permit the construction, modification, relocation and operation of any stationary source to be commenced without notifying the Secretary of such intent and obtaining a permit to construct, modify, relocate and operate the stationary source as required in the rule or any other applicable rule promulgated by the Secretary.

If applicable, the applicant meets the following (check all that apply):

- ☐ Relocation
- ☒ Modification
- ☐ Class I Administrative Update (45CSR13 Section 4.2.a)
- ☐ Class II Administrative Update (45CSR13 Section 4.2.b)

#### **45CSR16 (Standards of Performance for New Stationary Sources Pursuant to 40 CFR Part 60)**

45CSR16 applies to all registrants that are subject to any of the NSPS requirements described in more detail in the Federal Regulations section. Applicable requirements of NSPS, Subparts IIII, JJJJ and OOOO are included in General Permit G70-C.

The applicant is subject to:

- ☐ 40CFR60 Subpart IIII
- ☒ 40CFR60 Subpart JJJJ
- ☒ 40CFR60 Subpart OOOO

#### **45CSR22 (Air Quality Management Fee Program)**

45CSR22 is the program to collect fees for certificates to operate and for permits to construct or modify sources of air pollution. 45CSR22 applies to all registrants. The general permit fee of \$500 is defined in 45CSR13. In addition to the application fee, all applicants subject to NSPS requirements or NESHAP requirements shall pay additional fees of \$1,000 and \$2,500, respectively.

Registrants are also required to obtain and have in effect a valid certificate to operate in accordance with 45CSR22 §4.1. The fee group for General Permit G70-C is 9M (all other sources) with an annual operating fee of \$200.

#### **40CFR60 Subpart JJJJ (Standards of Performance for Stationary Spark Ignition Internal Combustion Engines)**

Subpart JJJJ sets forth nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), and volatile organic compound (VOC) emission limits, fuel requirements, installation requirements, and monitoring requirements based on the year of installation of the subject internal combustion engine. The provisions for stationary spark ignition (SI) internal combustion engines for owners or operators of this Subpart have been included in General Permit G70-C, Section 13.

Emission Unit ID#	Engine Description (Make, Model)	Engine Size (HP)	Date of Manufacture	Provide Justification how 40CFR60 Subpart JJJJ is met.
ENG001 through ENG005	VRU Compressor Engines	76 bhp (each)	2015	<input type="checkbox"/> Met Emission Standard <input checked="" type="checkbox"/> Certified Engine
ENG006 through ENG007	VRU Compressor Engines	110 bhp (each)	2015	<input type="checkbox"/> Met Emission Standard <input checked="" type="checkbox"/> Certified Engine

**40CFR60, Subpart OOOO (Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution)**

EPA published its New Source Performance Standards (NSPS) and air toxics rules for the oil and gas sector on August 16, 2012. EPA published final amendments to the Subpart on September 23, 2013.

40CFR60 Subpart OOOO establishes emission standards and compliance schedules for the control of volatile organic compounds (VOC) and sulfur dioxide (SO<sub>2</sub>) emissions from affected facilities that commence construction, modification or reconstruction after August 23, 2011. The affected sources which commence construction, modification or reconstruction after August 23, 2011 are subject to the applicable provisions of this Subpart as described below:

**Gas well affected facilities are included in General Permit G70-C in Section 5.0.**

Are there any applicable gas well affected facilities? ☒ Yes ☐ No

If Yes, list.

API number(s) for each Gas Well at this facility	Date the Gas Well was drilled or re-fractured
47-017-06731-00	7/1/2017
47-017-06732-00	7/1/2017
47-017-06737-00	7/1/2017
47-017-06736-00	7/1/2017
47-017-06735-00	7/1/2017
47-017-06734-00	7/1/2017
47-017-06733-00	7/1/2017
One (1) Well Not Permitted At the time of Application	To Be Determined

**Centrifugal compressor affected facilities are included in General Permit G70-C, Section 11.0.**

Are there any applicable centrifugal compressor affected facilities not located at the well site?

☐ Yes ☒ No

Each centrifugal compressor affected facility, which is a single centrifugal compressor using wet seals that is located between the wellhead and the point of custody transfer to the natural gas transmission and storage segment. A centrifugal compressor located at a well site, or an adjacent well site and servicing more than one well site, is not an affected facility under this Subpart.

**Reciprocating compressor affected facilities are included in General Permit G70-C, Section 12.0.**

Are there any applicable reciprocating compressor affected facilities not located at the well site?

☐ Yes ☒ No

Each reciprocating compressor affected facility, which is a single reciprocating compressor located between the wellhead and the point of custody transfer to the natural gas transmission and storage segment. A reciprocating compressor located at a well site, or an adjacent well site and servicing more than one well site, is not an affected facility under this subpart.

***Pneumatic controllers affected facilities are included in General Permit G70-C, Section 10.0.***

Are there any applicable pneumatic controller affected facilities? ☐ Yes ☒ No

For the natural gas production segment (between the wellhead and the point of custody transfer to the natural gas transmission and storage segment and not including natural gas processing plants), each pneumatic controller affected facility, which is a single continuous bleed natural gas-driven pneumatic controller operating at a natural gas bleed rate greater than 6 scfh.

***Requirements for storage vessel affected facilities are included in General Permit G70-C, Section 7.0. Determination of storage vessel affected facility status is included in Section 6.0 of General Permit G70-C.***

Are there any applicable storage vessel affected facilities? ☐ Yes ☒ No  
If No, list any emission reduction devices and control efficiencies used to avoid 40CFR60 Subpart OOOO.

The enclosed vapor combustors (EC001 through EC002) will be used to achieve a minimum control efficiency of 98%.

Each storage vessel affected facility, which is a single storage vessel located in the oil and natural gas production segment, natural gas processing segment or natural gas transmission and storage segment, and has the potential for VOC emissions equal to or greater than 6 tpy as determined according to this section by October 15, 2013 for Group 1 storage vessels and by April 15, 2014, or 30 days after startup (whichever is later) for Group 2 storage vessels. A storage vessel affected facility that subsequently has its potential for VOC emissions decrease to less than 6 tpy shall remain an affected facility under this subpart.

#### **40CFR63 Subpart ZZZZ (National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines)**

Subpart ZZZZ establishes national emission limitations and operating limitations for hazardous air pollutants (HAP) emitted from stationary reciprocating internal combustion engines (RICE) located at major and area sources of HAP emissions. This Subpart also establishes requirements to demonstrate initial and continuous compliance with the emission limitations and operating limitations. This section reflects EPA's final amendments to 40 CFR part 63, Subpart ZZZZ that were issued on January 15, 2013 and published in the Federal Register on January 30, 2013.

WVDEP DAQ has delegation of the area source air toxics provisions of this Subpart requiring Generally Achievable Control Technology (GACT). The provisions of this Subpart have been included in this general permit under Section 13.0.

Emission Unit ID#	Engine Description (Make, Model)	Engine Size (HP)	Date of Manufacture	New or Existing under 40CFR63 Subpart ZZZZ?	Provide Justification how 40CFR63 Subpart ZZZZ is met.
ENG001 through ENG005	Ford MSG-425	76	2015	New	40CFR63 Subpart ZZZZ is met by meeting the requirements of 40CFR60 Subpart JJJJ
ENG006 through ENG007	Ford CSG-637	110	2015	New	40CFR63 Subpart ZZZZ is met by meeting the requirements of 40CFR60 Subpart JJJJ

Are there any engines that fall in the window of being new under 40CFR60 Subpart ZZZZ but manufactured before the applicability date in 40CFR60 Subpart JJJJ? ☐ Yes ☒ No

### SOURCE AGGREGATION DETERMINATION

"Building, structure, facility, or installation" is defined as all the pollutant emitting activities which belong to the same industrial grouping, are located on one or more contiguous and adjacent properties, and are under the control of the same person.

Are there surrounding wells or compressor stations under "common control" of the applicant?  
☒ Yes ☐ No

Are the properties in question located on "contiguous or adjacent" properties?  
☐ Yes ☒ No

Are there surrounding facilities that share the same two (2) digit SIC code?  
☒ Yes ☐ No


#### **Final Source Aggregation Decision.**

☒ Source not aggregated with any other source.

☐ Source aggregated with another source. List Company/Facility Name:

### RECOMMENDATION TO DIRECTOR

The information provided in the permit application, including all supplemental information received, indicates the applicant meets all the requirements of applicable regulations and the applicant has shown they meet the eligibility requirements of General Permit G70-C. Therefore, impact on the surrounding area should be minimized and it is recommended that the facility should be granted registration under General Permit G70-C.

Permit Engineer Signature: 

Name and Title: David Keatley - NSR Permit Writer

Date: January 31, 2017